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ABSTRACT

Two studies were conducted to determine the effects of specific learning centers on preschoolers' functional uses of language. It was hypothesized (1) that different centers would elicit different functions of language and (2) that contexts which promote fantasy play would elicit more multifunctional utterances than would other contexts. In the first study, preschoolers in three separate same-age classrooms (2-, 3-, and 4-year-olds) were observed on a time-sampling schedule during free play over a period of 4 weeks. Preschoolers' individual utterances were coded as serving either one or more than one function. Housekeeping and block centers tended to elicit most individual and multifunctional utterances. Fantasy play and social interaction among children in these centers were thought to be responsible for this mature use of language. In the second study, same-age and same-sex dyads from two age groups (4- and 5-year-olds) were observed in experimental settings while playing with either blocks or dramatic props. Both contexts elicited a predominance of imaginative language, although dramatic props elicited more imaginative language than blocks. With age, children generated more individual functions and multifunctional utterances. In general, results suggest that different learning centers typically used in preschool classrooms elicit very different functions of language. (RH)

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The effects of classroom ecology on preschoolers' uses of functions of language*

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Running head: Functions of language

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Abstract

Two studies were conducted to determine the effects of specific learning centers on preschoolers' functional uses of language. In Study 1, preschoolers in three separate same-age classrooms (2, 3, and 4 year olds) were observed on a time sampling schedule during their free play periods for four weeks. Preschoolers' individual utterances were coded as serving one or more than one function; functions were defined following Halliday. The housekeeping and block centers tended to elicit the most individual and multifunctional utterances. The fantasy play and social interaction among children in these centers were thought to be responsible for this mature use of language.

In Study 2, same-age and same-sex dyads from two age groups (4 and 5 years old) were observed in experimental settings playing with blocks alone and with dramatic props alone. Both contexts elicited a predominance of imaginative language, though the dramatic context elicited more imaginative language than the blocks. With age, children generated more individual functions and multifunctional utterances.

The goal of many early education and child care programs is the stimulation of children's oral language development (see Bartlett, 1972, for a review). Programs have typically stressed children's use of correct syntactic and phonological forms. More recently, educators (e.g., Cazden, 1972) and psychologists (e.g., Dore, 1978) have suggested the goal of stimulating children's use of language to serve a variety of functions. Halliday (1969-70) has constructed a model of functions of language that preschool and school-age children often use. He found that as children develop they tend to use more language serving a variety of functions and that each of their utterances tend to serve more than one function simultaneously (multifunctional utterances). The functions of language, as outlined and defined by Halliday (1969-70), can be found in Table 1.

/Table 1 here/

Children's command of a large repertoire of functions of language should enable them to communicate more effectively in a variety of situations and with a variety of people (Hymes, 1970). In addition, as children master the various uses of language, they are simultaneously mastering the corresponding syntactic forms which convey the functions. The intent of the present study was to examine the extent to which different learning centers typically found in preschool classrooms (e.g., the block corner) elicited different functions of language from preschool children.

The research to date that has examined children's use of functions of language in early education settings has been global. For example, researchers compared children's oral language production in open and

traditional classrooms (Pinnell, 1976; Borman, 1979); and compared language uses at home with language uses in nursery school settings (Corsaro & Cook-Gumperz, 1976). This research is global in that the effects of specific settings within each of these larger settings was not described. Previous observational work suggests that specific activity settings within global settings elicit very different forms of social-cognitive (Rubin & Siebel, 1979) and linguistic (Pellegrini, 1982) behavior from preschoolers. Pellegrini (1982), for example, found that children used language very differently in a block center than they did in a dramatic play center; that is the dramatic play context tended to elicit more explicit, or cohesive, language than the blocks context. In this paper, a description of the effects of specific centers on children's use of functions of language will be given. In the studies reported here it was hypothesized, first, that different centers would elicit different functions of language. Second, it was hypothesized that contexts which promote fantasy play would elicit more multifunctional utterances than the other contexts.

These hypotheses were examined in two separate studies. The first was an observational study of the occurrence of functions of language in different play contexts in three different preschool classrooms. The second was an experimental study in which same-age and same-sex dyads from two age groups were observed playing with blocks alone and with dramatic play props alone. The functions of language elicited as a function of age and play context were examined.

Study 1

Method

Subjects

The thirty children involved in the first study all attended a university preschool. A sample of ten children, five boys and five girls, was drawn from each of three classrooms. The group of ten two-year-olds comprised the total enrollment of that classroom; they ranged in age from 25 to 34 months (M = 27.1). Children in each of the three- and four-year old classrooms were randomly chosen from each of their classes. The three-year-olds ranged in age from 38 to 49 months (M = 43.0). The four year olds ranged in age from 49 to 60 months (M = 54.6).

Procedure

Children were observed during free play periods in their regular classrooms on Mondays and Tuesdays during the fifth, seventh, and ninth weeks of the Fall, 1981 academic quarter. Each child was observed for five randomly sampled one minute periods at each of the three observation sessions. Thus, each child was observed five times in each of three separate sessions for a total of 15 observations. Each child was simultaneously observed by the author and a second observer. All observations were made from behind a one-way viewing screen. The first utterance generated during the one minute observation period was the only one recorded. Children's individual utterances were coded according to Halliday's (1969-70) functions of language as: instrumental, regulatory, interactional, personal, heuristic, imaginative, and representational. Each utterance was scored as serving one

or more than one function. Children were observed in the following centers; dramatic, blocks, art, water/sand.

If the child did not generate an utterance in the one minute observation period he/she was given a zero score for each function. For each of the three sessions, each child had five separate scores for each of the language functions (i.e., a zero or a 1). Each child's language function score for a whole session was the mean number of functions across the five observations for that session. For example, if in the five observations for one session a child generated five utterances, three of which were unifunctional (e.g., being only interactional) and two of which were multifunctional (e.g., being both interactional and heuristic), the interactional function score for that session would be 1, because he/she generated 5 interactionals in 5 observations (5:5 = 1). The heuristic function score would be .4 because he/she generated 2 heuristics in 5 observations (2:5 = .4). He/she would be given 0 scores for the other functions for that observation because they were not observed. For each session, each child also had a multifunctional score. The multifunctional language score was the number of different individual language functions generated across the five observations. The total language function score for the above noted example would be .4 because in the five observations two different functions were observed (2:5 = .40).

Reliability for the coding of language functions was established by comparing the simultaneous observations of the two observers on one-third of the total observations. The inter-rater reliability for the language functions ranged from 82%-93% ($\underline{M}$ = 89.7%).

In addition, the number of adults and other children present in the activity center was coded.

Design and Data Analysis Procedures

Study 1 utilized a repeated measure design. The three separate observation sessions were the repeated factors. Activity center was the grouping variable. The dependent variables were specific functions and multifunctional language scores. Multiple comparisons on significant main effects were calculated, at the .05 level, using the Student's Newman Keul procedure. In addition to the repeated measures analyses, a correlation matrix was constructed to examine the relations between the number of adults and other students present in each center and individual and multifunctional language scores. In this study age was not used as a second grouping variable because not all children at all age levels were observed in all of the four centers. Thus, age could not have been incorporated into the repeated measures design.

Results/Discussion

The descriptive statistics for language functions in each context are summarized in Table 2.

/Table 2 here/

The two hypotheses were supported: different contexts elicited different functions; the houskeeping center elicited the most varied functions of language. Children used significantly more instrumental, interactional, imaginative and multifunctional language in this center than in any of the

other centers. The block center, in turn, elicited significantly more imaginative and multifunctional language than did the art and water/sand centers.

The effects of specific activity centers on specific language functions and multifunctional scores, repeated on sessions, were analyzed. For instrumental language, there was a significant effect for center, F (3, 6) = 3.11, $p < .03$, and a significant difference between the repeated sessions, F (2, 6) = 5.77, $p < .004$. The housekeeping (M = .049) center elicited significantly more instrumental language than both the water/sand (M = .00) and the block (M = .01) centers. Significantly more instrumental language was observed in the third session (M = .063) than in second session (M = .0068). No other between group differences were significant.

There was a significant effect for center on interactional language, F (3, 6) = 4.68, $p < .004$. Housekeeping (M = .927) elicited significantly more interactional language than both the art (M = .595) and water/sand (M = .528) centers. The blocks center (M = .748) elicited less interactional language than the dramatic center but more than the water/sand and art centers.

There was a significant effect for center on the imaginative function, F (3, 6) = 20.25, $p < .0001$. The housekeeping center (M = .696) elicited significantly more imaginative language than the art (M = .135), water/sand (M = .095) and blocks (M = .460) centers. The blocks center elicited significantly more imaginative language than both art and water/sand centers. No other between group differences were significant.

Lastly, there was a significant effect for center on multifunctional language, F (3, 6) = 6.74, p < .0005. The housekeeping center (M = .233) elicited significantly greater multifunctional scores than art (M = .1275), water/sand (M = .122), and blocks (M = .184) centers. Blocks elicited significantly larger multifunctional scores than both art and water/sand centers. There was no effect for session or center on the remaining functions of language.

The first hypothesis, that different activity centers would elicit different functions of language, was supported. Housekeeping centers elicited more imaginative language than other centers. The block center elicited more imaginative language than both art and water/sand activities. The use of imaginative language in housekeeping centers is not a surprising finding. Other researchers examining play in preschool classrooms (Rubin & Siebel, 1979) found that preschoolers tend to engage in fantasy play in housekeeping centers. Rubin and Siebel (1979) also found that block centers elicited fantasy play from preschoolers. In their study, fantasy play with blocks resulted when groups of children, not individuals, played with blocks. Constructive play resulted when solitary children played with blocks. This explanation also fits the data of the present study. Children tended to engage in fantasy play with blocks in groups; that is, 71% of the times children played with blocks they did so in the presence of at least one other child. It seems then, that the presence of one peer in the blocks center elicited fantasy play. The significant correlation between peers present and imaginative language for three and four year olds further supports the notion

that children will engage in fantasy play when they are in groups.

Blocks, and the social interaction around them, elicited more imaginative langauge than did art and water/sand centers. Indeed, the blocks context elicited the second greatest (second only to the dramatic context) amount of interactional language. It seems, then, that children use more interactional and imaginary language in contexts such as blocks and housekeeping which elicit fantasy play.

The second hypothesis, that contexts which promoted fantasy play would elicit more multifunctional utterances, was supported. Those centers which elicited imaginative language (i.e., housekeeping and blocks) also tended to elicit multifunctional utterances. The reason for this may be that fantasy play is dependent upon both social interaction and the use of explicit language for sustenance (Pellegrini, 1982). That is, if role and prop fantasy transformations are not defined linguistically and agreed upon by individual players, other players will not be able to join in and sustain the play episode. Without explicit verbal transformations ambiguity results because players do not know what props are supposed to represent in the play episode. Fantasy play, then, elicits multifunctional language because it is dependent on both social interaction and the explicit use of language for sustenance.

Imaginative play in block and housekeeping centers, because it involves social interaction and is dependent upon language, is easily contrasted with art and water/sand centers. Children in these centers generated the lowest interactional language scores. Children in these centers do not tend to interact socially with co-present children or adults (Rubin & Siebel, 1979).

The parallel and solitary play characteristic of these centers (Rubin & Siebel, 1979) is not dependent upon social interaction for sustenance. Children in these centers are typically involved in solitary, not group, constructive or functional activities.

The last two ecological factors to be discussed in Study 1 will be time elapsed between observation sessions and number of adults and children present in individual centers. Children were observed every two weeks on three separate ocassions; a four week period elapsed between the first and third sessions. The relatively few effects due to session is consistent with the literature on children's social behavior in early education settings. McGrew (1979) found that when children first entered a nursery setting they were less social than were children already present in that setting. After two months of attendance, the social behavior of these relative newcomers was indistinguishable from the social behavior of their classmates. Rubin and Siebel (1979) found similar consistency; preschoolers' social interactions and cognitive forms of play did not vary across a three month period.

The relation between adults and other children present in activity settings and children's functional uses of language was examined through correlation analyses. Pearson product moment correlations were calculated, within each age group, among each of the functions of language, total functions, numbers of adults present, and number of children present. For two year olds significant correlations between the number of adults present and the following functions were observed (all r's have $df = 26$): interpersonal $r = .5$, $p < .006$; and total functions, $r = .49$, $p < .007$.

Adults present also correlated significantly with three year olds' use of functions of language (all r's have $df = 27$): imaginative, $r = -.47$, $p < .009$; and informative, $r = .56$, $p < .001$.

For four year olds, adults present correlated significantly with (all r's have $df = 28$): regulatory, $r = -.38$, $p < .03$; personal, $r = .43$, $p <$ and heuristic, $r = -.38$, $p < .03$. The number of students present for three year old correlated significantly, $r = .34$ $p < .05$, with total functions.

These significant correlations indicate that numbers of adults and students present in each center confounded the effect of center on children's use of functions of language. Thus, the discussion of the effects of centers in Study 1 should be cautiously interpreted. In order to determine the effects of center *per se*, the presence of adults and peers must be controlled. In Study 2 we attempted to control these factors.

Study 2

The data from Study 1 described children's functions of language during free play in their preschool classrooms. These data, however, should be interpreted cautiously because the effects for centers were confounded by adults and peers present. Further, in such free play settings, children are free to choose the center in which to interact. In this respect the effects of the centers and individual preference for those centers may also be confounded (Rubin, Fein, & Vandenberg, in press). That is, the functions of language children used in the centers may have been elicited not only by the centers themselves but also by children's individual differences which caused

them to choose those center. In order to identify the specific effects of activity centers on the development of children's uses of functions of language, Study 2 was carried, controlling for the possible confounding of individual preference for centers and differing numbers of adults and peers in the centers.

In this study we attempted to control for these variables by observing same-age and same-sex dyads from two age groups playing in a blocks context and in a dramatic context on four occasions. No adults were immediately present in these sessions. These two contexts were chosen because they elicited the most functions of language in Study 1. Results from Study 2 should provide information on two points. First, it should inform us as to the generalizability of the Study 1 results. That is, do these centers affect children's use of functions of language in an experimental setting as they did in a naturalistic setting. Second, the results from Study 2 will provide insight into the extent to which the use of these functions varies as a function of children's age.

The first hypothesis for Study 2 stated that contexts would affect differentially children's uses of specific functions and multifunctional language. Second, it was hypothesized that age would affect positively children's use of specific functions of language and uses of multifunctional language.

Methods

Subjects

The twenty children, ten boys and ten girls, involved in Study 2 all attended a university preschool. Ten children, same-sex same-age and friendship dyads, were randomly chosen from each of two classrooms. One classroom was composed of 4 year olds and the other of 5 year olds. Teachers were asked to construct friendship dyads of same-sex same-age (not more than two months age difference), children who often played together and who would probably play together in experimental play sessions. The children in the younger classroom ranged in age from 47 to 53 months (M = 51.40) and had Cooperative Preschool Inventory scores of M = 9.5, SD = 2.38. The children in the older classrooms ranged in age from 56 to 63 months (M = 59.00) and had Cooperative Preschool Inventory scores of M = 11.165, SD = 3.67.

Procedure. Only one female experimenter interacted with the children. She spent the two weeks prior to data collection interacting with the children in their classrooms so that she was familiar them. After the two week familiarization period the female experimenter escorted each dyad to the experimental play room in their school. She then withdrew to the videotaping booth. Each dyad was videotaped for four separate 20 minute sessions, twice with blocks and twice with dramatic props. The 12' x 14' room was equiped with two suspended microphones and a one-way mirror. Children were videotaped through the one way mirror. Following the completing of all observations individual children were administered the Cooperative Preschool Inventory.

For the dramatic play episodes the following props were on a 2 5' x 3' table: two doctors' kits, two dolls, two smocks, blankets, and pill bottles.

For the constructive play episodes, the following props were on the same table: wooden and colorful plastic blocks of various sizes, numerous styrofoam shapes, and pipe cleaners.

All language and corresponding actions were transcribed from the videotapes. Five utterances were randomly selected from each of the four observations. Utterances were coded, following the procedure outlined in Study 1, according to Halliday's (1969-1970) functions of language. Reliability for the coding of the utterances was established by having a graduate student recode all of the utterances coded by the author. The agreement between the scores ranged from 84%-95% (M = 91.3%).

Design and data analysis procedures. Study 2 utilized a 2 (age: 4 and 5 year olds) x 2 (sex) repeated measures (2 context: blocks and dramatic) design, using the language scores from the Cooperate Preschool Inventory as a covariate. The language score was used to equalize subjects' language ability. We were interested language variation due to age and context, not individual differences in language. Dependent variables were specific functions and multifunctional language scores. Multiple comparisons on significant main effects were examined using Student's Newman Keul procedure, set at the .05 level.

Results/Discussion

Descriptive statistics for the age x sex repeated measures design for specific functions and multifunctional language are displayed in Table 3.

/Table 3 about here/

The covariate, children's Cooperative Preschool Inventory (1970) language scores, was not significant for any of the analyses. Results relevant to the first hypothesis, that context would differentially affect children's use of specific functions of language and multifunctional language was, generally, not supported. Only for imaginative language was a significant difference between contexts observed, F (1, 15) = 5.160, $p < .03$. The dramatic context ($\bar{x}$ = 3.41) elicited significantly more imaginative language than did the blocks context ($\bar{x}$ = 2.878).

The second hypothesis, that age would affect positively children's use of individual functions of language and their multifunctional language was generally supported: Three individual function scores and multifunctional utterances increased with age. More specifically, a significant main effect for age was observed for instrumental language, F (1, 15) = 5.73, $p < .03$; five year olds (M = 11.15) used significantly more than four year olds (M = 9.5). A significant main effect for age was also observed for imaginative language, F (1, 15) = 5.359, $p < .03$; five year olds (M = .865) used significantly more than did four year olds (M = .712). For representational language there was, also, a significant age effect, F (1, 15) = 4.32, $p < .05$; five year olds (M = .939) used more than four year olds (M = .635). Lastly, for multifunctional utterances, age had a significant main effect, F (1, 15) = 36.381, $p < .0001$; five year old's utterances were more multifunctional (M = .63) than did the four year olds' utterances (M = .24).

The experimentally manipulated dramatic and blocks contexts in Study 2 and the naturalistic play contexts in Study 1 did not affect children's

functions of language usage in similar ways. In Study 1, the housekeeping corner elicited more instrumental, imaginative, interactional and multifunctional language than the blocks context. In Study 2 there was only a context difference for one function. Dramatic context elicited only more imaginative language than the blocks context. These results suggest that factors other than play context were influencing children's use of functions of language in Study 1. It may be, as Rubin et al. (in press) suggested, that individual preference to play in certain contexts and adults and peers present confound the effects of those contexts on children's uses of functions of language. Another explanation for these results may be due to the experimental and naturalistic contexts themselves. Language research (e.g., Cazden, 1975; Black, 1979) suggests that formal settings, such as experimental sessions, constrains the forms and functions of language used by children in such settings. A final explanation may be that the age differences of the children in Studies 1 (2-4 years) and 2 (4-5 years) caused different results between the experimental and naturalistic contexts. Further observational and experimental work testing these explanations is necessary.

The lack of significant differences between contexts on most of the functions of language in Study 2 may be due to the fact that children were engaging in imaginative play in both contexts. Indeed, the mean occurrence of imaginative language in the blocks context ($\underline{M}$ = .675) was larger than any other mean, except interpersonal language ($\underline{M}$ = .925). It seems, then, that children were engaging in social fantasy play in both contexts, though the dramatic context elicited more than the blocks context. As a result of the

contexts eliciting similiar behaivor, there were few between context differences.

Hypothesis 2 in Study 2, children use more individual functions and more multifunctional language with age, was supported. These data support Halliday's (1969-70) notion that the ability to use one utterance to serve multiple functions marks linguistic maturity. Thus, an additional measure of linguistic maturity, besides the traditional syntactic, semantic, and phonological measures, is the pragmatic measure of the ability to use language to do different things.

In summary, these two studies suggest that the different learning centers typically used in preschool classrooms elicit very different functions of language. Those centers which have children interacting in fantasy play tend to elicit most individual functions and most multifunctional language. The present studies suggest that blocks and dramatic play context elicit fantasy play. Further, these results support previous studies which suggested that learning centers differentially affected children's social-cognition (Rubin & Siebel, 1979) and linguistic behavior (Pellegrini, 1982). Lastly, the results from Study 2 supports Halliday's (1969-1970) thesis that with age children use more multifunctional langauge. Teachers of young children should use specific learning centers to elicit different functions of language from children. Lastly, it is recommended that educators use pragamtic measures, such as functions of language, as part of their assessment battery.

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Table 1

Halliday's Functions of Language: Definitions and Examples

Function	Definition: Language used to:	Example
Instrumental	Satisfy one's needs	I want the car.
Regulatory	Regulate others	Get the water.
Interactional	Define and consolidate groups	Let's be friends.
Personal	Express feelings	I like her.
Heuristic	Explore the environment	How come?
Imaginative	Create an environment	I'll be daddy.
Representational	Convey information	The car is red.

Table 2

Means for Each Context for Language Functions

	Functions							
	Instrum	Reg	Person	Interact	Imagin	Heurist	Represent	Multifunc
Dramatic	.072	.113	.175	.927	.696	.089	.257	.233
Blocks	.018	.090	.100	.748	.460	.065	.359	.184
Art	.049	.048	.140	.595	.135	.052	.252	.172
Water/Sand	.000	.038	.133	.528	.095	.080	.352	.122

Table 2a

Study 1: Significant effects on functions

Instrumental:

Housekeeping > water/sand = blocks

Interactional

Housekeeping > blocks > art = water/sand

Imaginative

Housekeeping > blocks > art = water/sand

Multifunctional

Housekeeping > blocks > water/sand = art

Table 2b

Significant Correlations (*p $<$.05, ** p $<$.01)

A. 2 year olds (N = 28)

Numbers of teachers:
Interpersonal: r = .50**
Total functions: r = .49**

B. 3 year olds (N = 29)

Numbers of teachers
Imaginative: r = -47**
Informational: r = .56**

C. 4 year olds (N = 30)

Number of teachers
Regulatory: r = -.38*
Personal: r = .43**
Imaginative: r = -.43**
Heuristic: r = -.38*

Number of students
Total functions: r = .34*

Table 3

Means x Age x Sex x Context for Language Functions

	Functions							
	Instrum	Reg	Person	Interact	Imagin	Heurist	Represent	Multifunc
Blocks								
4 yr. olds								
Male	.100	.350	.100	.925	.675	.150	.500	.400
Female	.133	.266	.133	.950	.633	.066	.716	.414
5 yr. olds								
Male	.200	.275	.175	.950	.725	.100	.900	.475
Female	.100	.300	.150	.966	.816	.100	.650	.440
Dramatic								
4 yr. olds								
Male	.125	.275	.100	.975	.725	.150	.675	.432
Female	.255	.333	.166	.966	.850	.150	.950	.523
5 yr. olds								
Male	.225	.325	.075	1.000	.925	.275	.925	.535
Female	.233	.450	.133	.983	.950	.200	.983	.561

Table 3a

Study 2: Significant effects on functions

Imaginative

Housekeeping > blocks

Age effects

Instrumental: 5 > 4

Imaginative: 5 > 4

Representational: 5 > 4

Multifunctional: 5 > 4